

## APPARATUS AND METHODS FOR TEXTURE MAPPING

### Abstract

The invention provides texture mapping techniques that facilitate interactive  
5 painting of a three-dimensional virtual surface by a user in object space, without  
requiring global parameterization. The texture mapping techniques feature rendering  
texture for a given virtual object using a plurality of composite textures, each formed by  
blending collapsible texture layers. Texture coordinates in texture space are derived  
using information determined at the time of surface mesh generation. The invention  
10 features dynamic texture allocation and deallocation, allowing a user to interactively  
modify the shape of a painted, three-dimensional model. Finally, the invention features  
an architecture for combined graphical rendering and haptic rendering of a virtual object,  
allowing a user to experience force feedback during the painting of the object in object  
space.

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